

REMARKS

Claims 1-21 are pending in the present application. By this response, claims 1, 9, 11 and 19-21 are amended. Claims 1, 11 and 20 are amended to recite subject matter similar to "receiving a server dump request from a client virtual machine via a network, and passing the thread dump to the client virtual machine via the network." Claims 9, 19 and 21 are amended to recite subject matter similar to "sending a server thread dump request to the server virtual machine via a network, and receiving a thread dump from the server virtual machine via the network." Support for these amendments may be found at least on page 5, lines 14-22 and Figure 1 of the current specification. Reconsideration of the claims in view of the above amendments and the following remarks is respectfully requested.

I. Examiner Interview

Applicant thanks Examiner Ali for the courtesies extended Applicant's representatives during the November 1, 2004 telephone interview. During the interview, Examiner Ali indicated that the above amendments would overcome the Iwazaki and Brodsky references. Therefore it is Applicant's understanding that, pending an update search by Examiner Ali, the present claims are now in condition for allowance. The substance of the interview is summarized in the remarks of the sections that follow.

II. 35 U.S.C. § 103, Alleged Obviousness, Claims 1, 9-11 and 19-21

The Office Action rejects claims 1, 9-11 and 19-21 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Iwazaki (U.S. Patent No. 5,642,507) in view of Brodsky et al. (U.S. Patent No. 5,960,199). This rejection is respectfully traversed.

As to claims 1, 11 and 20, the Office Action states:

As per claim 1, Iwazaki teaches the invention as claimed, including a method for generating a full thread dump at a server virtual machine, comprising:

receiving a server dump request from a client virtual machine (col. 1 lines 25-42; col. 3 lines 39-46; col. 3 line 65 – col. 4 line 10; col. 4 lines 44-64);

invoking a task to issue a dump request (col. 3 lines 33-43; col. 5 lines 43-49);

generating a dump in response to the dump request (col. 4 lines 44-64; col. 5 lines 43-49); and

passing the dump to the client virtual machine (col. 4 line 65 – col. 5 line 7; col. 5 lines 50-62).

It is noted that Iwazaki does not specifically state that the virtual machine dumps are “thread dumps”. However, as it is well known that virtual machines are commonly used to run Java applications, which make heavy use of threads, it would have been obvious to one of ordinary skill in the art to indicate that the dumps are “thread dumps”. Furthermore, Brodsky teaches a method of monitoring an object-oriented system, and providing an ongoing trace of an object’s execution, which is similar to a “thread dump” (col. 3 line 52 – col. 4 line 29). As threads are implemented within object-oriented interfaces, Brodsky thus shows how a “thread dump” could be returned at any point during an object’s execution. Thus, it would have been obvious to one of ordinary skill in the art to combine Iwazaki and Brodsky to arrive at a method of generating a “thread dump” upon request by a client virtual machine since Brodsky provides a debugging interface that would be immensely useful in monitoring and correcting errors in a virtual machine. The method of Iwazaki suffers the drawback of being able to collect information during an error condition, but does not provide means for correcting the problem on the fly. Brodsky provides such an interface that allows debugging during execution (Abstract). Hereinafter, this discussion forms the basis for how Brodsky makes up for the deficiencies of Iwazaki, particularly that Iwazaki does not contemplate threads specifically, or that Iwazaki does not contemplate a debugger.

Office Action dated August 13, 2004, pages 2-3.

Claim 1, which is representative of the other rejected independent claims 11 and 20 with respect to similarly recited subject matter, reads as follows:

1. A method for generating a full thread dump at a server virtual machine, comprising:
 - receiving a server dump request from a client virtual machine via a network;
 - invoking a task to issue a thread dump request;
 - generating a thread dump in response to the thread dump request;
 - and
 - passing the thread dump to the client virtual machine via the network.

Iwazaki and Brodsky, taken alone or in combination, fail to teach or suggest receiving a server dump request from a client virtual machine via a network, and passing the thread dump to the client virtual machine via the network.

Iwazaki is directed to collecting control data of a virtual machine in order to collect control data of a control portion of a virtual machine as well as control data of an operating system controlled by the control portion. The function of the operating system that uses the data which is to be collected is suppressed at the time when the data is to be collected, and the operating system requests the control portion to transfer the control portion data. In response to the data transfer request, the function of the control portion using the data that are to be collected is suppressed, and then the control portion data is transferred to the buffer of the operating system.

Thus, with the system of Iwazaki, an operating system that is running the virtual machine performs the request for the control data to be collected from the virtual machine. In contradistinction, the presently claimed invention receives a server dump request from a client virtual machine via a network. Iwazaki and Brodsky, taken alone or in combination, do not teach or suggest this feature. The Office Action alleges that Iwazaki teaches receiving a server dump request from a client virtual machine at column 1, lines 25-42, column 3, lines 39-46, column 3, line 65 to column 4, line 10 and column 4, lines 44-64, which read as follows:

In a case where trouble has developed in software, for example, the contents of the main memory are output to an external memory at the time when the trouble developed and are analyzed in order to investigate the cause of the trouble. The function for outputting the contents of the main memory to the external memory is called a dumping function.

So far, few systems have been employed to effect the dumping in the conventional virtual machine systems. For instance, there has been proposed a system in which when trouble develops under the condition where two OSs are operating under the control of the CP, the contents of the main memory are output at one time to an output medium such as a magnetic tape or a magnetic disk. In this system, however, since the data of these OSs has not been edited, there arise such problems that the required data is incomplete and that the analysis requires laborious work over extended periods of time.

(Column 1, lines 25-42)

In an example shown in FIG. 1(B), the OS(1) outputs the data thereof to an output medium 25-1 in response to a data collection instruction from an external unit or an internal unit and, on the other hand, the CP outputs the data thereof to an output medium 25-2 independently of each other. However, this system has a problem of poor reliability in the collected data since the OS data and the CP data are collected at different times.

(Column 3, lines 39-46)

FIG. 2 is a block diagram which schematically illustrates a first fundamental constitution of an apparatus according to the present invention. In FIG. 2, reference numeral 10 denotes a virtual machine system, 11 denotes an input medium such as a console, 12 denotes a main memory, 13 denotes an operating system (OS) which operates on a virtual machine, 18 denotes OS data that are related to the OS 13 and are to be collected, 19 denotes a buffer provided in a region accessible by the OS, 20 denotes a control portion (CP) of the virtual machine, 24 denotes CP data that are related to the CP 20 and are to be collected, and reference numeral 25 denotes an output medium such as a magnetic tape or a magnetic disk.

(Column 3, line 65 to column 4, line 10)

In the data collection according to the present invention, when, for example, a data collection instruction is issued from the input medium 11, the OS function suppression processing portion 14 of the OS 13 suppresses the function of the OS 13 which uses the OS data 18 that are to be collected and, then, the CP data transfer request processing portion 15 requests the CP 20 to transfer the CP data 24.

Upon receipt of a data transfer request, the CP function suppression processing portion 21 of the CP 20 suppresses the function of the CP 20 that uses the CP data 24, and then the CP data transfer processing portion 22 transfers the CP data 24 to the designated buffer 19 in order to resume the function of the CP 20 that had been suppressed.

The OS/CP data collection processing portion 16 of the OS 13 simultaneously edits the CP data 24 transferred to the buffer 19 and the OS data 18 that are to be collected, and outputs them to the output medium 25. Thereafter, the OS function resumption processing portion 17 resumes the function of the OS 13 that had been suppressed.

(Column 4, lines 44-64)

In column 1, lines 25-42, Iwazaki describes dumping the contents of the main memory to an external memory of the virtual machine at the time when the trouble developed and that those contents are analyzed in order to determine the cause of the trouble. In column

3, lines 39-46, Iwazaki describes that the data collected is sent to an output medium. In column 3, line 65 to column 4, line 10, Iwazaki describes an input medium 11 and an output medium which are both part of the virtual machine system 10. Column 4, lines 44-64, Iwazaki describes that the input medium 11, which is part of the virtual machine system 10, issues a data collection instruction to request an output of a collection of data to an output medium 25, which is part of the same virtual machine system 10. Thus, Iwazaki merely responds to a request from an input medium, which is part of the same virtual machine system, to collect data from the virtual machine and output it to an output medium which is part of the same virtual machine, as shown in Figures 2 and 3. The input medium of Iwazaki is described as a console, which may use a keyboard (external), mouse (external) or touchscreen (internal); however, the console is described throughout the Iwazaki reference as being part of the virtual machine system. The operating system receiving a request from a console which is part of the same virtual machine as described by Iwazaki and, nowhere, in any section of Iwazaki, is sending the request from the input medium via a network taught or suggested. Thus, Iwazaki does not teach or suggest receiving a server dump request from a client virtual machine via a network. Brodsky is relied upon as teaching "thread dumps"; however, teaching thread dumps does not make up for the deficiencies of Iwazaki, as Brodsky does not teach or suggest receiving a server dump request from a client virtual machine via a network.

Additionally, Iwazaki and Brodsky, taken alone or in combination fail to teach or suggest passing the thread dump to the client virtual machine via the network. The Office Action alleges that Iwazaki teaches passing the thread dump to the client virtual machine at column 4, line 65 to column 5, line 7 and column 5, lines 50-62, which read as follows:

According to the present invention, the OS function suppression processing portion 14 and the CP function suppression processing portion 21 suppress the functions that use data which are to be collected, and the CP data transfer processing portion 22 transfers the CP data 24 to the buffer 19 to a region that is accessible by the OS 13. This enables the OS 13 to make reference to the CP data 24 in a false manner. Therefore, the OS data 18 and the CP data 24 can be simultaneously collected by the OS/CP data collection processing portion 16.

(Column 4, line 65 to column 5, line 7)

In the data collection according to the present invention, the CP data 24 that are usually collected by the CP data collection processing portion 42 are copied onto an empty entry of the CP0 buffer 45 (accumulated in the CP buffer 45) together with inherent data such as present time and identifier at a particular event of the CP function processing portion 41.

When, for instance, a data collection instruction is issued from the input medium 11, the OS data collection processing portion 43 of the OS 13 copies the OS data 18 to be collected onto the OS buffer 46 and, then, the CP data transfer request processing portion 15 requests the CP 20 to transfer the CP0 buffer 45.

(Column 5, lines 50-62)

In column 4, line 65 to column 5, line 7, Iwazaki describes transferring the collected data from the control portion to a buffer that is accessible by the operating system. In column 5, lines 50-62, Iwazaki describes that in response to a data collection instruction issued by the input medium 11, operating system data 18 is collected onto the operating system buffer 46. However, the input medium 11, operating system data 18 and the operating system buffer 46 are all part of the virtual machine system 10. Thus, the thread dump is not passed to the client virtual machine via a network. Thus, Iwazaki does not teach or suggest passing the thread dump to the client virtual machine via the network. Brodsky is relied upon as teaching "thread dumps"; however, teaching thread dumps does not make up for the deficiencies of Iwazaki, as Brodsky does not teach or suggest passing the thread dump to the client virtual machine via the network.

As per claim 9, Iwazaki teaches the invention as claimed, including a method for generating a server virtual machine full thread dump at a remote virtual machine, comprising:

- sending a server thread dump request to the server virtual machine (col. 1 lines 25-42; col. 3 lines 39-46; col. 3 line 65 – col. 4 line 10; col. 4 lines 44-64); and

- receiving a thread dump from the server virtual machine (col. 4 line 44 – col. 5 line 7; col. 5 lines 43-62).

Brodsky teaches the invention as claimed, including the following limitations not shown by Iwazaki:

- presenting the thread dump (Abstract, col. 3 line 52 – col. 4 line 29).

Office Action dated August 13, 2004, pages 2-6.

Independent claims 9, 19 and 21 recite subject matter similar to that in independent claims 1, 11 and 20. As discussed above, Iwazaki and Brodsky, taken alone or in combination, fail to teach or suggest receiving a server dump request from a client virtual machine via a network, and passing the thread dump to the client virtual machine via the network. Thus, Iwazaki and Brodsky, either alone or in combination, do not teach or suggest sending a request to a server via a network or receiving a thread dump from a server via the network.

Furthermore, there is not so much as a suggestion in either reference to modify the references to include such features. That is, there is no teaching or suggestion in Iwazaki or Brodsky that a problem exists for which receiving a server dump request from a client virtual machine via a network, and passing the thread dump to the client virtual machine via the network, is a solution. To the contrary, Iwazaki teaches requesting data collection within a virtual machine system. Brodsky merely teaches thread dumps. Neither reference even recognizes a need to receive a server dump request from a client virtual machine via a network, and to pass the thread dump to the client virtual machine via the network, as recited in claim 1, 9, 19 and 21.

Moreover, neither reference teaches or suggests the desirability of incorporating the subject matter of the other reference. That is, there is no motivation offered in either reference for the alleged combination. The Office Action alleges that the motivation for the combination is because Brodsky "provides a debugging interface that would be immensely useful in monitoring and correcting errors in a virtual machine." As discussed above, Brodsky is directed to an object-oriented tool for displaying both a graphical and textural trace of an object-oriented model during execution. Neither reference receives a server dump request from a client virtual machine via a network, and passes the thread dump to the client virtual machine via the network. Thus, the only teaching or suggestion to even attempt the alleged combination is based on a prior knowledge of Applicant's claimed invention thereby constituting impermissible hindsight reconstruction using Applicant's own disclosure as a guide.

One of ordinary skill in the art, being presented only with Iwazaki and Brodsky, and without having a prior knowledge of Applicant's claimed invention, would not have found it obvious to combine and modify Iwazaki and Brodsky to arrive at Applicant's

claimed invention. To the contrary, even if one were somehow motivated to combine Iwazaki and Brodsky, and it were somehow possible to combine the two systems, the result would not be the invention, as recited in claims 1, 9, 11 and 19-21. The result would be simply output collected data to an output medium in response to input medium request and display the result, if possible, in a graphical and textural trace of an object-oriented model during execution. The resulting system still would not receive a server dump request from a client virtual machine via a network, and pass the thread dump to the client virtual machine via the network.

Thus, Iwazaki and Brodsky, taken alone or in combination, fail to teach or suggest all of the features in independent claims 1, 9, 11 and 19-21. At least by virtue of their dependency on claim 9, the specific features of claim 10 are not taught or suggested by Iwazaki and Brodsky, either alone or in combination. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 1, 9-11 and 19-21 under 35 U.S.C. § 103.

III. 35 U.S.C. § 103, Alleged Obviousness, Claims 2, 8, 12 and 18

The Office Action rejects claims 2, 8, 12 and 18 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Iwazaki (U.S. Patent No. 5,642,507) in view of Brodsky et al. (U.S. Patent No. 5,960,199) in view of Xia (U.S. Patent No. 6,542,900 B1). This rejection is respectfully traversed.

Claims 2, 8, 12 and 18 are dependent on independent claims 1 and 11 and, thus, these claims distinguish over Iwazaki and Brodsky for at least the reasons noted above with regards to claims 1 and 11. Moreover, while Xia may teach a remote method invocation protocol, Xia does not provide for the deficiencies of Iwazaki and Brodsky, and, thus, any alleged combination of Iwazaki, Brodsky and Xia would not be sufficient to reject independent claims 1 and 11 or claims 2, 8, 12 and 18 by virtue of their dependency.

Moreover, the Office Action may not use the claimed invention as an "instruction manual" or "template" to piece together the teachings of the prior art so that the invention is rendered obvious. *In re Fritch*, 972 F.2d 1260, 23 U.S.P.Q.2d 1780 (Fed. Cir. 1992).

Such reliance is an impermissible use of hindsight with the benefit of Applicant's disclosure. *Id.* Therefore, absent some teaching, suggestion, or incentive in the prior art, Iwazaki, Brodsky and Xia cannot be properly combined to form the claimed invention. As a result, absent any teaching, suggestion, or incentive from the prior art to make the proposed combination, the presently claimed invention can be reached only through an impermissible use of hindsight with the benefit of Applicant's disclosure a model for the needed changes.

In view of the above, Iwazaki, Brodsky and Xia, taken either alone or in combination, fail to teach or suggest the specific features recited in independent claims 1 and 11, from which claims 2, 8, 12 and 18 depend. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 2, 8, 12 and 18 under 35 U.S.C. § 103.

IV. 35 U.S.C. § 103, Alleged Obviousness, Claims 3-6 and 13-16

The Office Action rejects claims 3-6 and 13-16 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Iwazaki (U.S. Patent No. 5,642,507) in view of Brodsky et al. (U.S. Patent No. 5,960,199) in view of "JNI FAQ for JDK.1" hereinafter "JNI". This rejection is respectfully traversed.

Claims 3-6 and 13-16 are dependent on independent claims 1 and 11 and, thus, these claims distinguish over Iwazaki and Brodsky for at least the reasons noted above with regard to claims 1 and 11. Moreover, while JNI may teach capturing and passing thread dumps, JNI does not provide for the deficiencies of Iwazaki and Brodsky, and, thus, any alleged combination of Iwazaki, Brodsky and JNI would not be sufficient to reject independent claims 1 and 11 or claims 3-6 and 13-16 by virtue of their dependency. Therefore, absent some teaching, suggestion, or incentive in the prior art, Iwazaki, Brodsky and JNI cannot be properly combined to form the claimed invention. As a result, absent any teaching, suggestion, or incentive from the prior art to make the proposed combination, the presently claimed invention can be reached only through an impermissible use of hindsight with the benefit of Applicant's disclosure a model for the needed changes.

In view of the above, Iwazaki, Brodsky and JNI, taken either alone or in combination, fail to teach or suggest the specific features recited in independent claims 1 and 11, from which claims 3-6 and 13-16 depend. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 3-6 and 13-16 under 35 U.S.C. § 103.

V. 35 U.S.C. § 103, Alleged Obviousness, Claims 7 and 17

The Office Action rejects claims 7 and 17 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Iwazaki (U.S. Patent No. 5,642,507) in view of Brodsky et al. (U.S. Patent No. 5,960,199) in view of "JNI FAQ for JDK.1" in view of Xia (U.S. Patent No. 6,542,900 B1). This rejection is respectfully traversed.

Claims 7 and 17 are dependent on independent claims 1 and 11 and, thus, these claims distinguish over Iwazaki, Brodsky and JNI for at least the reasons noted above with regards to claims 1 and 11. Moreover, Xia does not provide for the deficiencies of Iwazaki, Brodsky and JNI, and, thus, any alleged combination of Iwazaki, Brodsky, JNI and Xia would not be sufficient to reject independent claims 1 and 11 or claims 7 and 17 by virtue of their dependency. Therefore, absent some teaching, suggestion, or incentive in the prior art, Iwazaki, Brodsky, JNI and Xia cannot be properly combined to form the claimed invention. As a result, absent any teaching, suggestion, or incentive from the prior art to make the proposed combination, the presently claimed invention can be reached only through an impermissible use of hindsight with the benefit of Applicant's disclosure a model for the needed changes.

In view of the above, Iwazaki, Brodsky, JNI and Xia, taken either alone or in combination, fail to teach or suggest the specific features recited in independent claims 1 and 11, from which claims 7 and 17 depend. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 7 and 17 under 35 U.S.C. § 103.

VI. Conclusion

It is respectfully urged that the subject application is patentable over the prior art of record and is now in condition for allowance. The Examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the Examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

Respectfully submitted,

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